

HOW COLD CAN IT GET?

Suggested Grades

4, 5

SD Mathematics Strand & Standard (*Primary for Task*)

Number Sense

5.N.1.4 Locate negative integers on a number line.

Task Summary

Students use a number line to investigate positive and negative integers.

Time and Context of Task

One 45-50 min. class period

Materials Needed

Paper, pencils, number lines, dice, floor blocks or shapes

Author and Lead Teacher for This Task

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Students will be able to experience negative numbers on a number line. Students are divided into groups and the team that had the coldest temperature wins.

By rolling the dice, students will move forward (+) on odd numbers, and backward (-) on even numbers. Game one will include 10 rolls, game two 15 rolls, and game three 20 rolls of the dice.



CONTENT STANDARDS

Primary Standard

Strand Name: Number Sense

SD Goal: Students will develop and use number sense to investigate the characteristics of numbers in a variety of forms and modes of operation.

Indicator: Use the structural characteristics of a set of real numbers and its various subsets.

Standard: 5.N.1.4 Locate negative integers on a number line.

NCTM Process Standards

Problem solving

- Build new mathematical knowledge through problem solving
- Apply and adapt a variety of appropriate strategies to solve problems

Communication

- Organize and consolidate their mathematical thinking through communication

Connections

- Recognize and apply mathematics in context outside of mathematics

Problem-Solving Strategies

- Modeling
- Acting out the problem
- Looking for patterns
- Use of manipulative
- Team cooperation

ASSESSMENT TOOLS

Task Rubric

Standard	Advanced	Proficient	Basic	Below Basic
5.N.1.4 Locate negative integers on a number line.	Students can relate the negative positive movements on the number line. They can demonstrate through writing that they understand the concept.	Students can relate the location of the negative numbers on the number line, and can successfully play the game. They can relate to the negative numbers in writing.	Students are unable to negotiate the negative/positive movements on the number line, but can relate the concept of less than and greater than.	Students are unable to grasp the concept of negative integers.

Additional rubrics can be retrieved from K-12 Exemplars.com
<http://www.exemplars.com/resources/rubrics/assessment.html>

**Fifth Grade Number Sense
Performance Descriptors**

Advanced	Fifth grade students performing at the advanced level: <ul style="list-style-type: none"> • find prime, composite, and factors of numbers; • use division to convert fractions to decimals; • order negative integers without a number line; • solve problems using division; • determine least common multiple and greatest common factor of two whole numbers.
Proficient	Fifth grade students performing at the proficient level: <ul style="list-style-type: none"> • find prime, composite, and factors of numbers from 1 to 50; • read, write, order, and compare numbers from .001 to 1,000,000,000; • convert fractions and decimals (tenths, fourths, halves and hundredths); • interpret negative integers on a number line; • solve problems using estimation; • find quotient of whole numbers using a two-digit divisor; • determine equivalent fractions; • multiply and divide decimals; • determine squares of numbers.
Basic	Fifth grade students performing at the basic level: <ul style="list-style-type: none"> • read, write, order, and compare numbers from .01 to 100,000; • know prime and composite numbers to 20; • recognize unit fractions; • label negative integers on a number line; • find quotient of whole numbers using one-digit divisor; • round whole numbers.

**Fifth Grade Number Sense
ELL Performance Descriptors**

Proficient	Fifth grade ELL students performing at the proficient level: <ul style="list-style-type: none"> • model the rational number system and describe the order and value relationships; • compute with whole numbers and decimals; • apply computational strategies in solving problems; • read, write, and speak the language of mathematics.
Intermediate	Fifth grade ELL students performing at the intermediate level: <ul style="list-style-type: none"> • identify components of the rational number system; • describe the order and value relationships, including simple operations, of whole numbers; • explain in mathematical terms the sequence of steps used in solving problems; • give simple oral or written responses to directed questions on topics presented in class.
Basic	Fifth grade ELL students performing at the basic level: <ul style="list-style-type: none"> • apply number operations to solve problems involving whole numbers; • recognize and use basic mathematical terms; • respond to yes or no questions and to problems presented pictorially or numerically in class.
Emergent	Fifth grade ELL students performing at the emergent level: <ul style="list-style-type: none"> • solve problems using addition, subtraction, multiplication, and division; • copy and write numerical symbols; • imitate pronunciation of numbers and mathematical terms; • use non-verbal communication to express mathematical ideas.
Pre-emergent	Fifth grade ELL students performing at the pre-emergent level: <ul style="list-style-type: none"> • observe and model appropriate cultural and learning behaviors from peers and adults; • listen to and observe comprehensible instruction and communicate understanding non-verbally.

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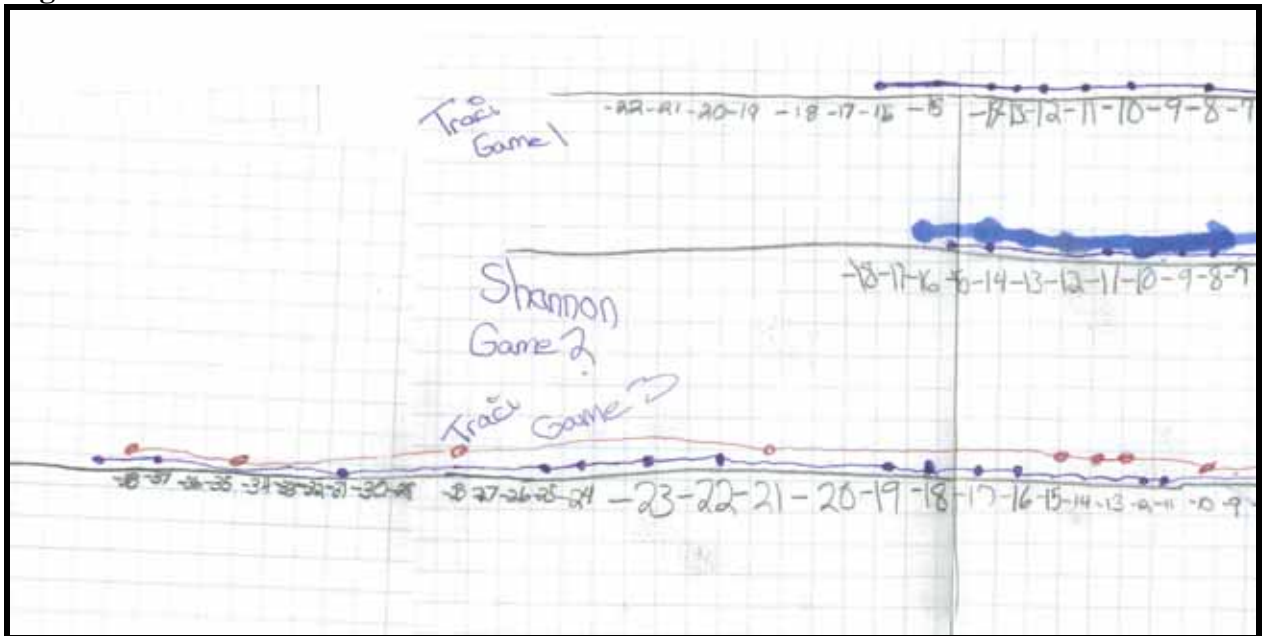
Student Work Samples



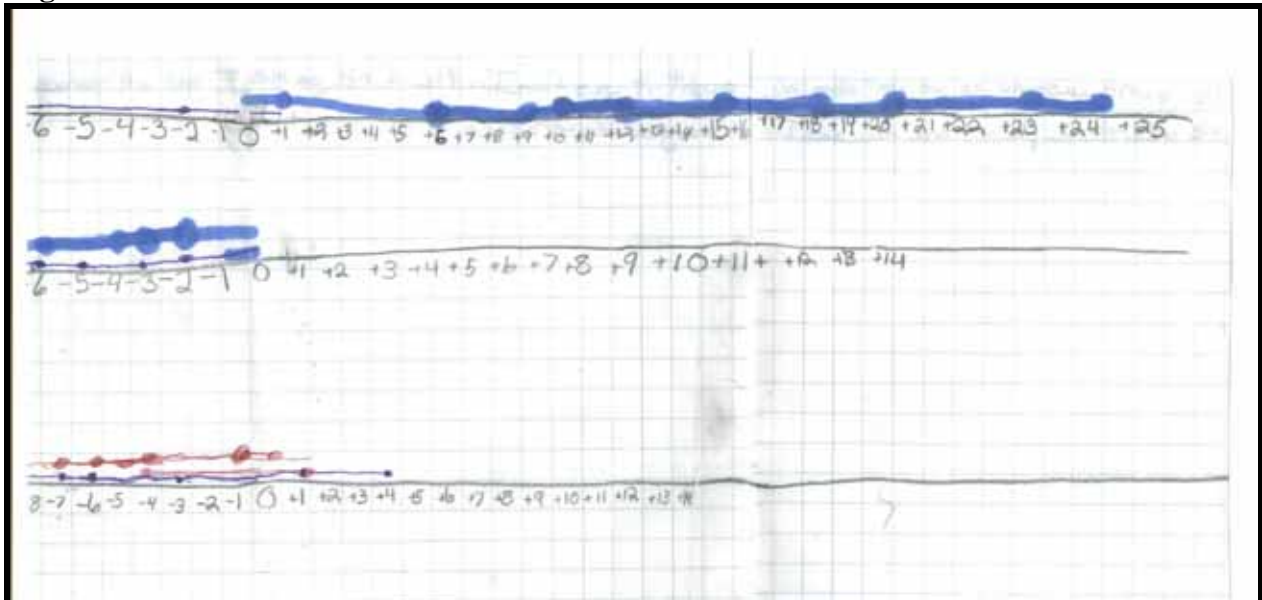
As you examine the samples, consider the following questions:

- In light of the standard/s addressed and the assessment tools provided, what evidence does the work provide that students are achieving proficiency in the knowledge and skills addressed by the standard/s for the task?
- Is the task/activity well designed to help students acquire knowledge and demonstrate proficiency? Is the task/activity clearly aligned with the standards? In what ways would you adapt the task/activity to better meet the needs of your students?

Student Work Sample #1
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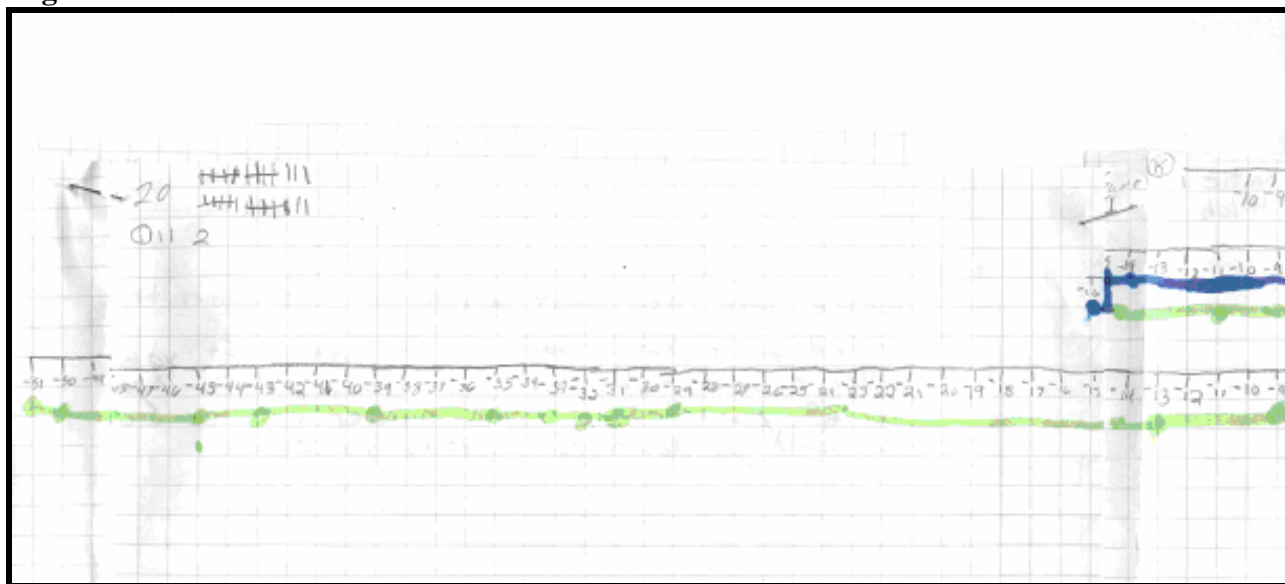
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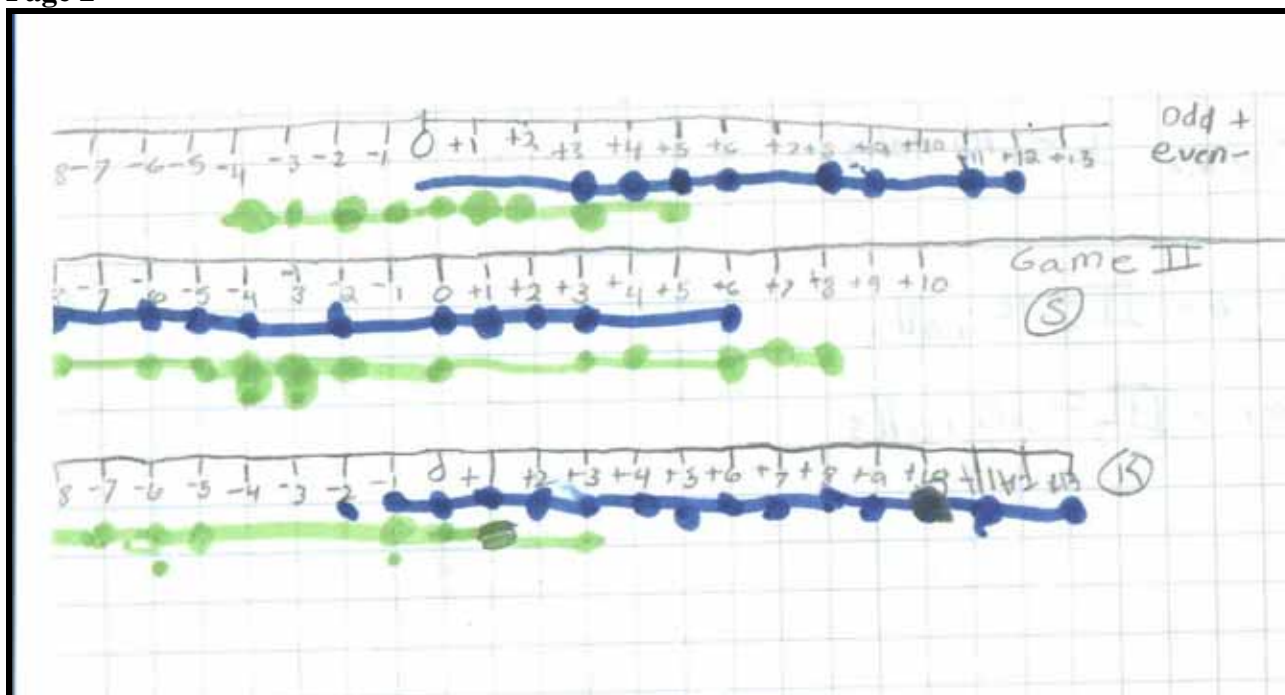
Looking at Student Work – Instructor notes and rating for work samples #1:

Advanced. The student used a complete number line for all games and did an exceptional job of communicating the action and results. The student communicated a better understanding of positive and negative numbers through their analysis of the activity.

Student Work Sample #2
Page 1



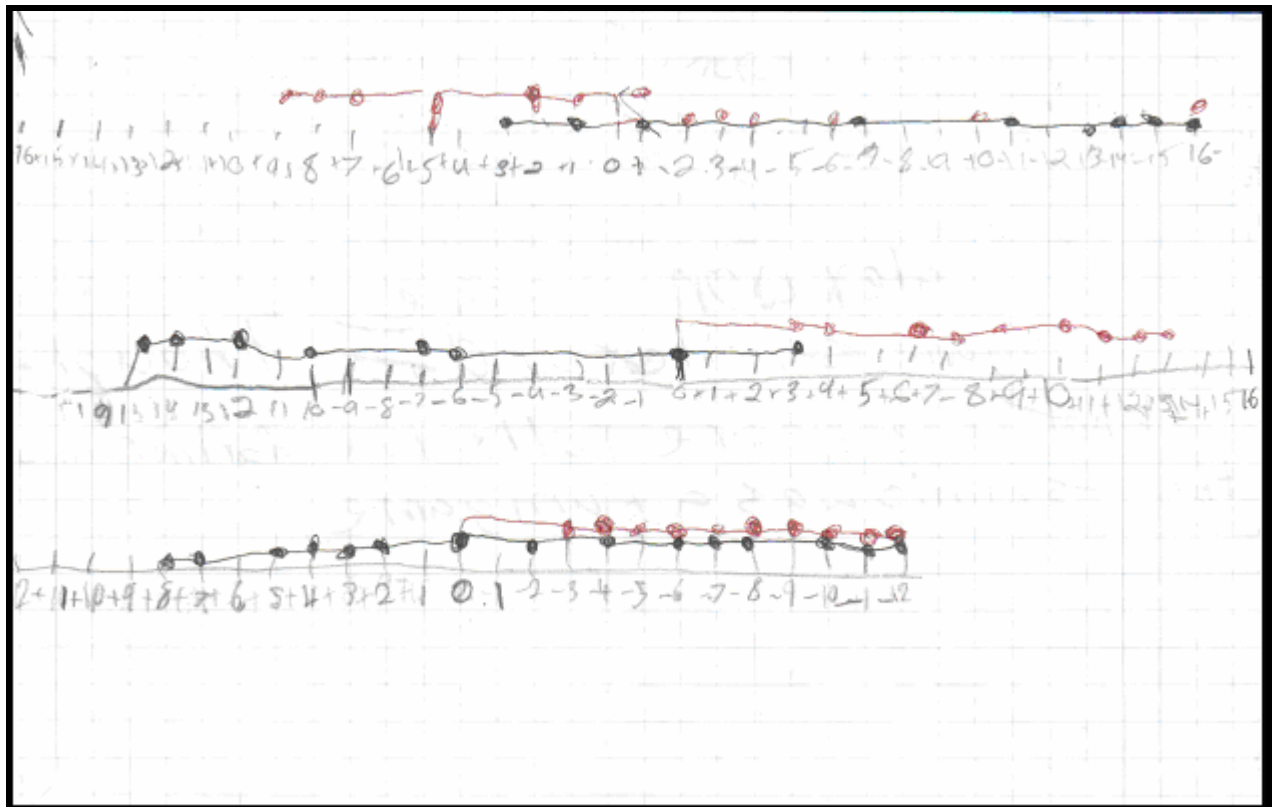
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Looking at Student Work – Instructor notes and rating for work sample #2:

Proficient. The student correctly completed the task, and graphed the data correctly on the number line. The understanding of the concept of positive and negative was not clearly stated, though through teacher observation was present.

Student Work Sample #3



Looking at Student Work – Instructor notes and rating for work sample #3:

Basic. The student was able to graph the data with some precision, but was unable to fully grasp the real world connection of positive and negative numbers on the completion of the tasks.

INSTRUCTIONAL NOTES

Author Comments

The students were enthusiastic about the game, and seemed to understand the positive and negative movements on the number line.

Task Extensions

The students could apply this to a real world situation if they were to compare grades or temperatures.

Common Strategies

Students used the manipulatives provided and were able to graph easily using the number line.

Common Misunderstandings

Some students had a hard time yet with the concept of even and odd numbers.

Resources

SD Mathematics Content Standards

<http://www.doe.sd.gov/contentstandards/math/index.asp>

SD Assessment and Testing

<http://www.doe.sd.gov/octa/assessment/index.asp>

The National Assessment of Educational Progress (NAEP)

<http://www.doe.sd.gov/octa/assessment/naep/index.asp>

National Council of Teachers of Mathematics

<http://nctm.org/>

Looking at Student Work

<http://www.lasw.org/index.html>